



US006473146B1

(12) **United States Patent**  
**Lee**

(10) **Patent No.:** **US 6,473,146 B1**  
(45) **Date of Patent:** **Oct. 29, 2002**

(54) **LIQUID CRYSTAL DISPLAY DEVICE AND A METHOD FOR MANUFACTURING A GROUNDING DEVICE**

JP 406082803 A \* 3/1994  
JP 200258789 A \* 9/2000

(75) **Inventor:** Sang-Chul Lee, Kyonggi-do (KR)

\* cited by examiner

(73) **Assignee:** Samsung Electronics Co., Ltd., Suwon (KR)

*Primary Examiner*—Toan Ton

*Assistant Examiner*—Hoan Nguyen

(\*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(74) *Attorney, Agent, or Firm*—McGuireWoods LLP;  
Hac-Chan Park

(21) **Appl. No.:** 09/401,963

(57) **ABSTRACT**

(22) **Filed:** Sep. 22, 1999

An LCD device in which a plurality of grounding protrusions are formed in a region not having a signal transmission pattern among the bottom surface of a printed circuit board in contact with a bottom chassis so as to increase a contact area between the printed circuit board and the bottom chassis, to thereby prevent a damage caused by an electro-magnetic wave and error of devices.

(51) **Int. Cl.<sup>7</sup>** ..... G02F 1/1333; G02F 1/1345

(52) **U.S. Cl.** ..... 349/152; 349/58; 349/150

(58) **Field of Search** ..... 349/58, 62, 149,  
349/150, 152

(56) **References Cited**

**FOREIGN PATENT DOCUMENTS**

JP 40371921 A \* 12/1992

**5 Claims, 6 Drawing Sheets**

